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A2B

(54) **Process for preparing semi-finished and finished dessert products**

(57) A process for preparing semi-finished and finished dessert products from fruit and/or vegetables or from the concentrates thereof and, if desired, from milk or a milk product, together with sugar, an edible acid or buffer salt, and dyeing and/or flavouring agents, by heat-treatment and, if desired, by preservation, in which there is added to the components a pectin with a low or high esterification grade and, suitably only before use a Ca²⁺ and/or Mg²⁺ source.

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SPECIFICATION

Process for preparing semi-finished and finished dessert products

- 5 This invention relates to a process for preparing semi-finished and finished dessert products containing 1 to 99, preferably 30 to 70%, by weight of fruit and/or vegetables, particularly for preparing such products which contain milk or milk products. 5
- Commonly, commercially available compositions containing fruit and a milk product are prepared from a fruit, an edible acid, sugar colouring and flavouring/aromatizing agents, and a milk product. For example, fruit yoghurts are obtained by mixing a yoghurt with cooked fruit, edible acid, sugar and a flavouring aromatizing agent. Fruit-containing curd creams are prepared by layering flavoured curd and fruit jelly one on the other. [M. Balatoni and F. Ketting: Tejipari Kezikonyv (Handbook for the Milk Industry) pp. 334-340 (in Hungarian), Mezogazdasagi Kiado, Budapest 1981]. There are many problems involved in the preparation of these products since 10
- 15 the properties of the basic materials differ widely and are difficult to reconcile. 15
- One of the greatest problems concerns stability, i.e. the achievement of a homogeneous appearance because the casein content of milk is denatured by the acid content of fruits, whereby the sensational properties of the product may be significantly deteriorated. Another problem lies in the rapid microbiological deterioration caused by the milk product character and 20
- 20 the lack of aseptic production. 20
- As a consequence of these disadvantages, commercially available products of the above type are not sufficiently diversified, have a low real fruit content and a short period of quality preservation or storage (about 20 days).
- It is an object of the invention to provide a process for preparing semi-finished dessert 25
- 25 products with high fruit and/or vegetable content and processing, if desired, a long quality preservation or storage period, lasting up to 4 years. 25
- The fruit component of the composition may be, for example, apple, sour-cherry, apricot, peach, raspberry, blackcurrant, redcurrant, gooseberry, mulberry, elder, vine, plum, yosta or pear. The vegetable component may be, for example, squash, carrot, potato, sorrel, spinach, tomato, 30
- 30 haricot, musk melon, green peas, vegetable marrow or pattison. 30
- The invention is based on the recognition that an enrichment of the fruit or vegetable basic materials of dessert products with a pectin esterified to a low or high grade and the stable, three-dimension cross-linking of the pectin by Ca^{2+} and/or Mg^{2+} ions can be carried out at different times.
- 35 When using a pectin with an esterification grade of 5 to 50%, preferably 25 to 36%, as pectin and a milk product as Ca^{2+} or Mg^{2+} source, a stable, cross-linked structure, i.e. bonding between pectin and Ca^{2+} or Mg^{2+} ions will, be formed before the denaturation of casein in the acidic medium. The consistency of the thus prepared product is hard, pudding-like. The use of a pectin having an esterification grade of 50 to 92%, preferably 60 to 70%, assures the stability 40
- 40 of the product up to the microbiological deterioration of the milk as the denaturation of casein in the acidic medium is prevented by the protective colloid character of the pectin. The thus-prepared product is liquid. 40
- According to the process of the invention, in addition to commonly used additives, i.e. a sugar, an edible acid, buffer, aromatizing/flavouring and/or colouring agents, including pectin 45
- 45 having a high or low esterification grade, in an amount of 0.05 to 5% by weight, preferably 0.1 to 2% by weight, calculated on the weight of the product is added to the fruit and/or vegetables or to a concentrate thereof, and then the product is heat-treated and preserved in a known manner. Thus, a semi-finished product is obtained having a long period of quality preservation. From this semi-finished product, a ready-for-consumption product can be prepared 50
- 50 by adding a Ca^{2+} and/or Mg^{2+} source, preferably by adding milk or a milk product. Syrups with a high Ca^{2+} and Mg^{2+} content or calcium and magnesium salts or the solutions of these salts approved for the food industry may also be used as Ca^{2+} or Mg^{2+} sources. The amount of the Ca^{2+} or Mg^{2+} source is suitably such that the finished product contains 100 to 1200 mg/Kg of Ca^{2+} or 60 to 720 mg/Kg of Mg^{2+} . Within these limits, each ion may replace the other in the 55
- 55 ratio of their equivalents. Thus, ice-creams, turmix drinks as well as ready-for-consumption puddings, torte-creams, ice-creams and turmix foams storable up to the beginning of the microbiological deterioration may be prepared. 55
- Alternatively, sugar, an edible acid or buffer, and a colouring and/or flavouring/aromatizing agent may be mixed with the fruit and/or vegetables or with a concentrate thereof purified and 60
- 60 chopped or pounded in a known manner; and then pectin with a low or high esterification grade in an amount of 0.03 to 3 wt%, preferably 0.06 to 1.2 wt.% as, calculated on the weight of the product, together with milk or a milk product are added and finally, the product is subjected to a heat-treatment. Thus, a finished product is obtained, the time of quality preservation or storage of which is the same as is common for milk products.
- 65 The heat-treatment may be carried out in continuous or intermittent pasteurizing equipment at 65

a temperature from 75 to 100°C for 4 to 50 minutes, preferably at 94°C for 15 minutes. Alternatively, the heat-treatment may be performed by using an UHTH (Ultra High Temperature) process at a temperature from 100 to 150°C for 4 to 600 seconds, preferably at 110°C for 45 seconds [dr. Balatoni M., dr. Ketting F.: *Téjipari Kézikönyv* (Handbook for the Milk Industry) pp. 180-181 (in Hungarian) Mezogazdasági Kiadó, 1983].

As Ca^{2+} or Mg^{2+} sources there may be used phosphates, carbonates, oxides, hydroxides, chlorides, acetates, citrates, hydrogen carbonates, lactates, orthophosphates and hydrogen phosphates; the use of calcium or magnesium chloride or lactate being preferred. Solutions of these compounds may also be employed.

The Ca^{2+} and Mg^{2+} ions may completely replace each other i.e. in a proportion of 1 to 100%, preferably in an amount of 20 to 70%, in the ratio of their atomic masses. Considering the atomic mass of calcium and magnesium, respectively this corresponds to the ratio:

$$\text{Ca}^{2+} : \text{Mg}^{2+} = 40.08 \text{ g} : 24.3 \text{ g}$$

In the composition of the invention, the amount of the fruit and/or vegetables or of the concentrates thereof is suitably 1 to 99 wt.%, preferably 30 to 70 wt.%.

The compositions may contain sugar in an amount of 0 to 70 wt.%, preferably 0 to 30 wt.%. The term "sugar" is intended to refer to all simple or composed sugars or sugar alcohols or any well-known artificial sweetening agent used for sweetening. In the latter case, water in an amount adequate to the mass of the sugar is also added. The sugar may be e.g. sucrose, invert sugar, fructose, glucose, xylitol, mannitol or sorbitol. The artificial sweetening agent may be e.g. aspartam, saccharine or cyclamate.

The composition may also contain an edible acid in an amount of 0 to 2.5 wt.%, preferably in an amount of 0 to 1 wt.%. The edible acid may be, for example, citric acid, ascorbic acid, tartaric acid, lactic acid, phosphoric acid or maleic acid.

The compositions may optionally contain a buffer in an amount of 0 to 2.5 wt.%, preferably 0 to 1 wt.%. As buffer substances, e.g. alkaline metal or alkaline-earth metal citrates, such as potassium, sodium, calcium or magnesium citrate may be used.

If necessary, colouring or flavouring/aromatizing agents may be introduced into the compositions according to the Standard No. MSZ 14476-82 on "Food Industry Additives and Technological Auxiliary Materials" (in Hungarian).

When, according to the invention, a semi-finished product is prepared, this is mixed with milk in an amount of 10 to 1000 wt. %, preferably 50 to 200 wt.%.

The fruit or vegetable proportion of the products may optionally be varied; their mineral substance, vitamin and dietetic fibre content are extremely high. The products prepared by using milk product join the advantageous effects of the fruit and milk products concerning the physiology or alimentation thus, the consumption thereof is suggested for all age-groups, particularly to children and aged individuals. Finally, the ready-for-consumption products can be obtained within a few minutes from semi-finished products which can be stored for a long time (for several years).

In order that the invention may be well understood the following Examples are given by way of illustration only.

EXAMPLE 1

Preparation of a quash pudding base

50 kg of finely pounded quash pulp, 20 kg of quash base chopped into pieces measuring 0.5 × 0.5 mm, 19.1 kg of sugar, 15 litres of commercially available 10 % LM 102 pectin solution with an esterification grade of 28 to 34% (manufactured by Københavns Pektinfabrik, Denmark) and 0.4 litre of 50% aqueous tartaric acid solution were pumped into a round-bottom vacuum vessel fitted with a stirrer under continuous stirring. The mixture was boiled at a temperature of 55 to 60°C under a pressure of 26.6 Kpa with constant stirring for a few minutes. After achieving the desired dry substance content of $25.0 \pm 2.0\%$, the product was filled off and heat-treated in the usual manner.

Thus, 100 kg of pudding base were obtained having an intense colour, flavour and odour characteristic of the quash. This pudding base was a thin liquid having the following physico-chemical characteristics.

| | | | |
|----|-------------------------------|-------------|----|
| | Soluble dry substance content | 25.0 ± 2.0% | |
| | Quash content | 70% | |
| 5 | pH | 3.8 to 4.0 | 5 |
| | Ca ²⁺ content | 280 mg/kg | |
| 10 | Mg ²⁺ content | - | 10 |

The quality storage time of the product was 2 years.

Before the consumption, the pudding base is mixed or turmixed in a ratio of 2 : 1 with cold or warm milk, sweet cream or with another milk product.

On carrying out the mixing in the warm, a pourable product is obtained which solidifies to a pudding-like consistency after cooling. On carrying out the mixing in the cold, a bound consistency is immediately obtained.

The ready-for-consumption product amounts to 150 kg with a fruit content of 46.6%, a Ca²⁺ content of 587 mg/kg and a Mg²⁺ content of 60 mg/kg.

EXAMPLE 2

Preparation of a strawberry turmix drink

5 litres of commercially available 10% HM pectin solution with an esterification grade of 60 to 70% (manufactured by Kobenhavns pektinfabrik, Denmark) were added to 300 litres of warm milk in a round-bottom vacuum vessel fitted with a stirrer under constant stirring, then 70 kg of fresh or semi-finished strawberry pulp, 23.4 kg of sugar and 0.002 kg of an authorized food colouring agent were pumped in under continuous stirring. The desired dry substance content of 15 ± 2% was achieved at 55 to 60°C under a pressure of 26.6 kpa, then 1.2 kg of strawberry flavour (manufactured by Szilasmenti MgTSz, Hungary) were added immediately before filling. Finally, the thus-obtained product was filled in a manner commonly used in the milk industry, closed and stored or delivered, respectively under cooling.

Thus, 400 kg of strawberry turmix drink were obtained, the colour, flavour and odour of which are highly characteristic of the strawberry and milk with a consistency suitable for a turmix drink.

The physico-chemical characteristics of this drink were as follows:

| | | | |
|----|-------------------------------------|-------------|----|
| | Water-soluble dry substance content | 15.0 ± 2.0% | |
| 40 | Fruit content | 17.5 % | 40 |
| | Fat content | 2.1 | |

45 The quality preservation time of the product was the same as that of the milk.

EXAMPLE 3

Preparation of a sour-cherry ice-cream

80 kg of finely pounded fresh or semi-finished sour-cherry pulp, 15.3 kg of sugar, 15 litres of commercially available 10% LM 102 pectin solution with an esterification grade of 28 to 34% (manufactured by Kobenhavns Pektinfabrik) and 1 litre of a 20% solution of potassium citrate for adjusting the pH to 3.8 to 4.0 together with as 0.002 kg of an authorized food colouring agent were pumped into a round-bottom vacuum vessel fitted with a stirrer under continuous stirring. The mixture was then boiled at a temperature of 55 to 60°C under a pressure of 26.6 kpa for a few minutes to give the desired dry substance content of 25.0 ± 2.0%. Then 1.0 litre of a sour-cherry flavour (manufactured by Szilasmenti MgTSz, Hungary) was added and the whole mass was filled off, closed and heat-treated.

Thus, 100 kg of ice-cream base were obtained, the colour, flavour and odour are highly characteristic of the sour-cherry. The product was a thick liquid having the following physico-chemical characteristics.

Water-soluble dry substance content 25.0 ± 2.0%

Fruit content 80 %

pH 3.8 to 4.0

Ca²⁺ content 250 mg/kg

Mg²⁺ content 120 mg/kg

The quality preservation time of the product was 2 years.

Before consumption, the ice-cream base is vigorously stirred to turn mixed with whipped cream in a ratio of 5:2. The product has a hard consistency without any further cooling.

After placing into an ice-cream machine, 140 kg of an ice-cream-like composition are obtained with a strong colour, flavour and odour of sour-berry.

The product has a fruit content of 57%, a Ca²⁺ content of 464 mg/kg and a Mg²⁺ content of 86 mg/kg.

EXAMPLE 4

Preparation of a quince torte-cream

76 kg of quince pulp, 13.4 kg of sugar, 15 litres of a commercially available 10% LM 102 pectin solution with an esterification grade of 28 to 34% (manufactured by Kobenhavns Pektinfabrik), 0.002 kg of an authorized food colouring agent and 0.5 litre of a 20% potassium citrate solution for adjusting the pH to between 3.8 to 4.0, were pumped under constant stirring into a round-bottom vacuum vessel fitted with a stirrer. Then the mixture was cooked at a temperature of 55 to 60°C under a pressure of 26.6 kpa for a few minutes to give the desired dry substance content of 22.0 ± 2.0%. Then, the product was filled off, closed and heat-treated.

Thus 100 kg of a quince torte-cream base were obtained, the colour, flavour and odour of which were characteristic of the quince. The product was a thick liquid having the following physico-chemical characteristics:

Water-soluble dry substance content 22.0 ± 2.0%

Fruit content 76%

pH 3.8 to 4.0

Ca²⁺ content 501 mg/kg

The quality preservation time of the product was 2 years.

Before consumption, the torte-cream base was mixed with 10 litres of warm sweet cream, in which 0.356 kg of calcium lactate had been dissolved, then the thus-obtained mixture was gradually added under continuous stirring to 5 kg of creamed butter.

Thus, 115 kg of a quince torte-cream were obtained, the colour, flavour and odour of which were characteristic of the quince and which had a cream-like consistency. This torte-cream contained 66% of fruit, 936 mg/kg of Ca²⁺ and 67 mg/kg of Mg²⁺.

EXAMPLE 5

Preparation of a raspberry pudding finished product

25 Kg of finely pounded raspberry pulp, 13.32 kg of isosyrup (refr. 70%, consisting of 90% of reducing sugar, 42.5 % of which is fructose: manufactured by Szabadegyhazi Szeszipari Vallalat, Hungary), 22 litres of a commercially available 10% LM 104 pectin solution with an esterification grade of 25 to 30% (manufactured by Kobenhavns Pektinfabrik), 0.25 kg of potassium citrate and 5.4 g of Himbeerrot food colouring agent were pumped under constant stirring into a round-bottom vacuum vessel fitted with a stirrer. The mixture was cooked at 55 to 60°C under a pressure of 26.6 kpa for a few minutes (whilst 0.57 kg of water evaporates). Then the reduced pressure was stopped and 40 litres of milk of 60°C temperature were pumped in under continuous stirring. After mixing until homogenous, the product was immediately filled into clotted-cream glasses and closed by a method commonly used in the milk industry.

Thus, 100 kg of pudding were obtained with a bound consistency, the colour, flavour and odour were very intense and characteristic of raspberry.

The physico-chemical characteristics of the pudding product were as follows:

| | | | |
|----|--|---------------|----|
| | Soluble dry substance content | 17 \pm 2 % | |
| 5 | Raspberry content | 25% | 5 |
| | pH | 3.8 to 4.0 | |
| 10 | Ca ²⁺ content | 548 mg/kg | 10 |
| | Mg ²⁺ content | 128 mg/kg | |
| 15 | Mg ²⁺ content of the raspberry | 24.0 mg/100 g | 15 |
| | Ca ²⁺ content of the raspberry | 27.3 mg/100 g | |
| | Mg ²⁺ content of the milk | 17.0 mg/100 g | 20 |
| 20 | The quality preservation time of the product was the same as that of the milk. | | |

EXAMPLE 6

Preparation of an apricot pudding finished product

- 25 50 kg of finely pounded apricot pulp, 27.46 kg of an isosyrup (refr. 70%, consisting of 90% of reducing sugar, 42.5% of which is fructose: manufactured by Szabadegyhazi Szeszipari Valla-
lat, Hungary), 15 litres of a commercially available 10% LM 104 pectin solution with an esterifica-
tion grade of 25 to 30% (manufactured by Kobenhavns Pektinfabrik), 0.4 kg of potassium
citrate, 10 g Zuckerorgane as well as 10 g of Erdbeerrot food colouring agent were pumped in
30 a round-bottom vacuum vessel under constant stirring to produce 100 kg of a decoction. The
mixture was cooked at 55 to 60°C under a pressure of 26.6 kpa for a few minutes until
achieving 25 refr.%. Then, the reduced pressure was stopped and 0.2 kg of magnesium chloride
was added under continuous stirring.

The physico-chemical characteristics of the pudding product were as follows:

| | | | |
|----|---|----------------|----|
| 35 | Soluble dry substance content | 25 \pm 2 % | 35 |
| | Apricot content | 50% | |
| 40 | pH | 3.8 to 4.0 | 40 |
| | Ca ²⁺ content | 62 mg/kg | |
| 45 | Mg ²⁺ content | 575.26 mg/kg | 45 |
| | Ca ²⁺ content of the apricot | 13.8 mg/100 g | |
| 50 | Mg ²⁺ content of the apricot | 14.0 mg/100 g | 50 |
| | Mg ²⁺ content of MgCl ₂ | 25260 mg/100 g | |

The quality preservation time of the product was the same as that of the milk.

CLAIMS

1. A process for the preparation of semi-finished and/or finished dessert products from fruit and/or vegetables or concentrates thereof together with one or more of sweetening, buffering, colouring and flavouring agents and sugar, an edible acid or buffer edible acids, heat-treatment and, if desired, by preservation, in which there is added to the components a pectin having a low or high esterification grade and a source of Ca²⁺ and/ or Mg²⁺ ions.
2. A process as claimed in claim 1 in which the source of Ca²⁺ and/or mg²⁺ ions is added to the product after storage and before use thereof.
3. A process as claimed in claim 1 or claim 2 in which the source of Ca²⁺ and/or Mg²⁺ ions is milk or a milk product.

4. A process as claimed in any one of the preceding claims in which the pectin has an esterification grade of 50 to 75%, thereby to produce a thin product.

5. A process as claimed in any one of claims 1—3 in which the pectin has an esterification grade of 20 to 50%, whereby to produce a thick product.

5 6. A process as claimed in claim 1 for the preparation of products possessing the common time of quality preservation by mixing fruit and/or vegetables or the concentrate thereof purified and chopped or pounded in a known manner with sugar, an edible acid or buffer salt, dyeing and/or aromatizing agent and by using heat-treatment, which comprises adding to the mixture a pectine with a low or high esterification grade in an amount of 0.03 to 3% by mass as
10 calculated for the mass of the product and milk or a milk product before the heat-treatment. 10

7. A process as claimed in claim 1 for the preparation of products storable for a long period, by mixing fruit and/or vegetables or the concentrate thereof purified and chopped or pounded in a known manner with sugar, an edible acid or buffer salt, dyeing and/or aromatizing agent and by using heat-treatment, which comprises adding to the mixture a pectin with a low or high
15 esterification grade in an amount of 0.05 to 5% by mass as calculated for the mass of the product before the heat-treatment. 15

8. A process as claimed in claim 1 substantially as hereinbefore described with reference to the Examples.